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22 February 2003

Online at <https://mpra.ub.uni-muenchen.de/54571/>

MPRA Paper No. 54571, posted 19 Mar 2014 17:08 UTC

# **Federal Government Budget Deficits and the Crowding Out of Private Investment in the United States : Evidence for the 1990s\***

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## **Abstract**

This study investigates whether federal government budget deficits in the U.S. over the 1990-1999 period acted to crowd out private investment in new plant and equipment. Using quarterly data, empirical estimation clearly indicates that private investment was in fact negatively impacted by the budget deficit.

## **I. Introduction**

From the early 1970s and well into the 1990s, the ratio of federal budget deficits to GDP and the growth rate of the real federal government debt reached levels never before experienced in the United States during peacetime. As a result, until comparatively recently, there has been concern among policymakers, researchers, and the general public that the government budget deficit and growing federal debt may have been exercising adverse impacts on the economic system. Indeed, in response to the growing concern over potentially adverse economic effects of budget deficits, in 1995 the United States Congress began serious consideration of a balanced-budget amendment to the United States Constitution. The latter 1990s and into the years 2000 and 2001 have witnessed entry into the world of the federal budget surplus for the United States. However, the terrorist attack of September 11, 2001 and the ensuing declaration of "war on terrorism", combined with the U. S. economy on the brink of recession and subsequently thrown into one, have already raised the specter of reappearing budget deficits into the foreseeable future. As Alan Krueger (2003) observes, deficits are re-emerging as a major economic problem and they threaten to "crowd out" private sector

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investment in new plant and equipment and to hamstringing the U. S. economy. The present study is effectively a preliminary test of Krueger's (2003) hypothesis using recent data for the U. S.

There is a well-developed literature addressing the impact that government budget deficit may exercise on the economy. The "crowding out" component of this literature is especially well known. Stated simply, in the crowding out literature, a variety of theories have been developed that relate the size of the government budget deficit to the level of private sector spending (principally investment), the level of interest rates, and the GDP level. Although well-known parts of this literature, including "Ricardian Equivalence", argue—often very compelling—that government budget deficits do not crowd out private sector spending, much of this literature argues that a budget deficit does act to reduce private sector spending. Whether the budget deficit is viewed as completely or only partially crowding out private sector investment spending depends on the particular crowding out theory under examination. For example, one of the best known crowding out theories, "transactions crowding out", alleges that only partial crowding out occurs. On the other hand, another such theory, "ultra-rationality", takes the view that complete crowding out occurs.

Many theories that subscribe to non-zero crowding out argue that the budget deficit works through higher interest rates (among other things) to crowd out the private sector. As Krueger (2003) has recently observed, budget deficits in part create financial market pressures that elevate interest rates; those higher interest rates in turn act, *ceteris paribus*, to discourage interest-sensitive private expenditures (especially private investment in new plant and equipment). Declines in the latter expenditures in turn act to reduce real GDP growth as well as to diminish the growth rate of productive capacity.

In view of the above observations, it is not surprising that many studies of the economic impacts of federal budget deficits empirically investigate the effect that such deficits may exercise over interest rates. An extensive literature has evolved since 1980, a literature that has focused primarily on short-term rates of interest but also to some significant degree on long term rates. The findings of most of studies dealing with shorter term rates imply that budget deficits exercise no significant effect [e.g., Evans (1985; 1987), Hoelscher (1983), Makin (1983), Mascaro and Meltzer (1983), Ostrosky (1990)], although there are a few notable exceptions [Barth and Bradley (1989), Barth, Iden and Russek (1984; 1985)]. On the other hand, a sizable majority of empirical studies on budget deficits and long term interest rates find that deficits do exercise a significant impact on such rates [e.g., Al-Saji (1991; 1993), Barth, Iden, Russek, and Wohar (1989), Belton and Cebula (1992), Cebula (1988; 1991; 1997; 2000), Cebula and Saltz (1998), Hoelscher (1986), Tanzi (1985), Thomas and Abderrazak (1988a; 1988b)]. Most of the latter class of studies have found that budget deficits raise nominal long term rates and real (ex ante and ex post) long term rates, although there is an occasional exception to such findings [cf. Evans (1985; 1987), Darrat (2000)].

Given that there exists no true consensus in the literature on budget deficits and interest rates, the purpose of this study is to examine the impact of budget deficits on private sector investment in new plant and equipment in a different and arguably more direct way. Namely, rather than looking simply at the deficit-interest rate link *per se*, we instead focus directly on the possible relationship between investment (expressed as percent of GDP) and the federal budget deficit (as a percent of GDP). On the one hand, we are unlikely to generate new insights by re-examining the deficit-interest rate link; that issue has been studied quite extensively already, and (as observed above) without a totally clear set of conclusions. On the other hand, by focusing directly on the potential budget deficit-investment relationship, we may capture the net impact that the budget deficit exercises (if any) over investment, an impact that may well transcend the simple interest-rate mechanism and might include far more complex expectations issues and/or other factors. Moreover, by focusing on investment (as well as budget deficit) as a percent of GDP, our approach provides a useful economic perspective because it measures investment (as well as the deficit) relative to the size of the economy.

This study focuses on investment that is defined in terms of firm purchases of new plant and equipment. This focus is based on the fact that such investment not only impacts on the growth rates of real GDP and employment but also affects future productive capacity growth and hence potentially affects future inflation. To make the analysis current, the study deals with quarterly data for the period 1990.1-1999.4. A simple investment model is provided in Section II. Section III provides the empirical evidence, whereas Section IV offers conclusions.

## II. Investment Decisions : The Framework

Firms purchase (invest in) new plant and equipment when such purchases are expected to be consistent with their profit maximization goal. The discounted present value of investment opportunity "j", "DPVj", is given by

$$DPV_j = \sum_{t=1}^n (ERT_j - EC_{tj})^* (1 + DR)^{-t} + EJV_{nj}^* (1 + DR)^{-n} \quad (1)$$

where  $ERT_j$  and  $EC_{tj}$  are, respectively, the expected revenues and expected operating costs from opportunity j in year t; "n" is the time horizon during which j is expected to be economically viable; "DR" is the pertinent discount rate; and "EJV<sub>nj</sub>" is the expected salvage value of j at the termination of the n-year time horizon. As a practice matter, DR typically takes the form of a longer-term interest rate [Cebula, Killingsworth, and Belton (1994), Hoelscher (1986)]. The profit-maximizing firm is willing to purchase opportunity j when  $DPV_j > P_j$ , where "P<sub>j</sub>" is the current market price of j.

Based on the arguments in most theories of crowding out, such as transactions crowding out, the greater size of the federal budget deficit ["DEF"], the greater the upward pressure on interest rates [Carlson and Spencer (1975), Courant and

Gramlich (1986), Cebula, Killingsworth, and Belton (1994), Krueger (2003)]. In addition, other standard models, such as the loanable funds model (open or closed), argue that government borrowing acts to raise long term interest rates by increasing the competition for available funds [Barth, Iden, and Russek (1985), Cebula (2000), Hoelscher (1986), Thomas and Abderrazak (1988a), Krueger (2003)]. Moreover, based on nearly all of the published empirical studies of the impact of government budget deficits on longer term interest rates, the budget deficit apparently acts in reality to raise those long term rates significantly [Al-Saji (1991; 1993), Barth, Iden Russek, and Wohar (1989), Belton and Cebula (1992), Cebula (1988; 1991; 1993; 1997; 2000), Cebula and Saltz (1998), Hoelcher (1986), Thomas and Abderrazak (1988a; 1988b)]. Thus, it is argued here that to the extent that federal budget deficits raise long term interest rates, those higher interest rates (DR levels) reduce the expected profitability of investment projects, thereby reducing (a) the probability of investment in new plant and equipment by individual firms and (b) the observed level of investment in new plant and equipment in the aggregate.

Additionally, according to certain crowding out theories, including one associated with Keynes himself (1936, p. 120) and further developed by Carlson and Spencer (1975) and two somewhat related theories associated with Cebula (1973) and Ott and Ott (1970), growing government budget deficits and growing government debt potentially have an adverse impact on firms' expectations, i.e., budget deficits may act to erode business sector confidence in the health of the economy. Among other things, this may be reflected in a decline in the expected value of investment opportunities, i.e., DPVs decline as business confidence in the economy erodes in response to a government deficit. Indeed, as Carlson and Spencer (1975, p. 5) explain, government budget deficits "... could adversely affect the confidence of the private sector in its economic future ... [resulting in] an induced increase in liquidity preference ... ;and a diminished marginal efficiency of investment schedule ..." To the extent that federal budget deficits reduce DPV values through their adverse effects on firms' confidence levels, (a) the likelihood of investment in new plant and equipment (the probability of investment, "PI") by individual firms and (b) the observed level of investment in new plant and equipment in the aggregate are argued to be decreasing functions of government budget deficits [Cebula, Killingsworth, and Belton (1994)], *ceteris paribus*.

Naturally, the firm must obtain funds with which to make the investment purchases, and it borrows either externally (typically through a bond float) or internally (typically using retained earnings). Clearly, given a scenario in which  $DPV_j > P_j$  and in which credit is sufficiently available at an interest rate DR, the firm will seek to purchase  $j$ . The greater a firm's after-tax profits ("PROF"), the greater the potential magnitude of its retained earnings and hence the greater the availability of credit from internal sources. Alternately, the greater the growth rate of the money supply ("MSGR"), the greater may be the availability of credit from external sources and the lower may be the nominal cost of that credit, *ceteris paribus*. Hence, the probability of investment, PI, is hypothesized to be an increasing function of both PROF, *ceteris paribus*, and MSGR, *ceteris paribus*.

### III. The Empirical Model and Results

Based on the simple model and arguments presented in the preceding section, we would expect that

$$I = I(\text{DEF}, \text{PROF}, \text{MSGR}) \quad (2)$$

where

$I$  = investment

and where

$$I_{\text{DEF}} < 0, I_{\text{PROF}} > 0, I_{\text{MSGR}} > 0 \quad (3)$$

This specification corresponds most closely to that in Cebula, Killingsworth, and Belton (1994).

Based on equations (2) and (3), we estimate the following reduced-form equation :

$$\begin{aligned} I_t/Y_t = & a + b [\text{DEF}_t - 1/Y_t - 1] + c [\text{PROF}_t - 1/Y_t - 1] \\ & + d \text{MSGR}_t - 1 + e \text{TR} + u \end{aligned} \quad (4)$$

where

$I_t/Y_t$  = the ratio of the nominal seasonally adjusted gross private domestic investment in new plant and equipment in quarter  $t$  to the nominal seasonally adjusted level of GDP in quarter  $t$ , expressed as a percent;

$a$  = constant;

$\text{DEF}_t - 1/Y_t - 1$  the ratio of the National Income and Product Accounts (NIPA) nominal seasonally adjusted federal government budget deficit in quarter  $t - 1$  to the nominal seasonally adjusted level of GDP in quarter  $t - 1$ , expressed as a percent;

$\text{PROF}_t - 1/Y_t - 1$  = the ratio of after-tax nominal seasonally adjusted corporate profits in quarter  $t - 1$  to the nominal seasonally adjustment level of GDP in quarter  $t - 1$ , expressed as a percent;

$\text{MSGR}_t - 1$  the percentage rate of growth of the real M2 money stock in quarter  $t - 1$ ;

$\text{TR}$  = linear trend variable;

$u$  = stochastic error term.

All of these quarterly data were obtained from the *Economic Report of the President*, various issues. The time period studied runs from 1990.1 – 1999.4. The



choice of time period extends that in Cebula, Belton, and Killingsworth (1994), which began with 1971 and ended with 1992, and thereby makes the analysis relatively contemporary. The ADF (Augmented Dickey-Fuller) test reveals that, for the study period, all of the variables are stationary in levels with a trend. Accordingly, a simple linear trend variable, TR, is included in the estimate.

The OLS estimate of equation (4), using the White (1980) correction for heteroskedasticity, is given by :

$$\begin{aligned}
 (It/Yt) = & 0.085 - 0.44 (DEft - 1/Yt - 1) + 0.4 (PROft - 1/Yt - 1) \\
 & (-5.58) \qquad \qquad \qquad (+4.09) \\
 & + 0.0007 MSGRt - 1 + 0.04 TR, DW = 1.80, Rho = 0.07 \\
 & (+2.03) \qquad \qquad \qquad (+1.79)
 \end{aligned}
 \tag{5}$$

where terms in parentheses are t-values.

The estimated coefficient on the profit variable is positive, as hypothesized, and significant at the one percent level, so that higher corporate profits appear to lead to greater investment rates. The estimated coefficient on the money growth variable is also positive, and it is significant at the five percent level. Thus, there appears to be at least some empirical evidence that M2 growth positively affects investment. Finally, the estimated coefficient on the government budget deficit measure is negative and statistically significant at the one percent level. Thus, we find strong empirical evidence that federal budget deficits act to reduce, i.e., crowd out, private sector investment in new plant and equipment. This finding is entirely compatible with the previous study by Cebula, Killingsworth, and Belton (1994) for the period 1971-1992.

## V. Conclusion

Krueger (2003) has recently asserted that the huge federal budget deficits facing the U. S. "as far as the eye can see" threaten to "crowd out" private sector investment in new plant and equipment and to hamstring the U. S. economy, despite the likelihood of highly expansionary monetary policies. As a simple test of this argument, this study has empirically investigated the impact of federal government budget deficits in the United States on private sector investment in new plant and equipment, the latter being measured as the ratio of investment outlays to GDP. Among other things, expressing the investment variable as such a ratio permits evaluation of (1) the level of investment relative to the size of the economy and (2) how the ratio of investment to GDP is affected by budget deficits. Factors included in the analysis in addition to the budget deficit measure are corporate profits and a commonly accepted measure of money supply growth. A one-quarter time lag on each of the explanatory variables in the study avoids simultaneity bias.

The overall conclusion of the analysis is that, for the 1990-1999 study period,

federal government budget deficits in the U. S. acted to crowd out private sector investment in new plant and equipment : higher budget deficits acted to reduce the proportion of GDP that is devoted to such investment. This implies that government budget deficit reduced the relative rate of capital formation over the study period. The latter implies slower employment growth in capital goods industries (as well as elsewhere through a "trickle-down" effect) and a reduced growth rate of productive capacity (and productive efficiency). The latter in turn potentially implies an element of increased future inflation that to some degree could compromise the relative ability of the United States to compete in world markets.<sup>1</sup> Clearly, *budget deficits still do matter* ! The empirical evidence supports Krueger's concerns that forthcoming huge federal budget deficits will seriously compromise the health of the U. S. economy.

### Acknowledgement

Thanks are due to Ali Darrat. Naturally, the usual caveat applies.

### Note

1. Courant and Gramlich (1986, p. 88) argue that deficits not only crowd out capital investment but also, in the long run, cause inflation.

### REFERENCES

- Al-Saji, Amer K. (1991) : The Effect of Government Budget Deficit on Real Interest Rates : Empirical Evidence from Italy, *Rivista Internazionale di Scienze Economiche e Commerciali*, Vol. 38, pp. 871-878.
- Al-Saji, Amer k. (1993) : Government Budget Deficits, Nominal and Ex Ante Real Long-Term Rates in the U. K., 1960 : 1-1990 : 2, *Atlantic Economic Journal*, Vol. 21, pp. 71-77.
- Barth James R. and Michael Bradley (1989) : Evidence on Real Effects of Money, Deficits, and Government Spending, *Quarterly Review of Economics and Business*, Vol. 29, pp. 214-224.
- Barth, James R., George Iden and Frank Russek (1984) : Do Federal Deficits Really Matter ? *Contemporary Policy Issues*, Vol. 3, pp. 79-95.
- Barth, James R., George Iden and Frank Russek (1985) : Federal Borrowing and Short Term Interest Rates; Comment, *Southern Economic Journal*, Vol. 52, pp. 554-559.
- Barth, James R., George Iden, Frank Russek and Mark Wohar (1989) : Effects of Federal Budget Deficits on Interest Rates and the Composition of Domestic Output, Washington, D.C. : The Urban Institute.
- Belton, Willie J. and Richard J. Cebula (1992) : Deficits and Real Interest Rates in the United States : A Note on the Barro Theory Versus the Cukierman-Meltzer Theory of Government Debt and Deficits in a Neo-Ricardian Framework, *Economia Internazionale*, Vol. 45, pp. 289-295.
- Carlson, Keith and Roger Spencer (1975) : Crowding Out and its Critics, *Federal Reserve Bank of St. Louis Review*, Vol. 57, pp. 2-17.



- Cebula, Richard J. (1973) : Deficit Spending, Expectations and Fiscal Policy Effectiveness, *Public Finance/Finances Publiques*, Vol. 28, pp. 362-370.
- Cebula, Richard J. (2000) : Do Structural Federal Budget Deficit Impact Commercial Bank Interest Rates : Reply, *Public Finance Review*, Vol. 28, 195-199.
- Cebula, Richard J. (1993) : An Empirical Analysis of Federal Budget Deficits and Interest Rates Directly Affecting Savings and Loans, *Southern Economic Journal*, Vol. 60, pp. 28-35.
- Cebula, Richard J. (1988) : Federal Government Budget Deficits and Interest Rates : An Empirical Analysis for the United States, 1955-1984, *Public Finance/Finances Publiques*, Vol. 43, pp. 337-348.
- Cebula, Richard J. (1991) : A Note on Federal Budget Deficits and the Term Structure of Real Interest Rates in the United States, *Southern Economic Journal*, Vol. 57, pp. 1170-1173.
- Cebula, Richard J. (1997) : Government Deficits, Ex Post Real Long Term Interest Rates and Causality, *Banca Nazionale del Lavoro Quarterly Review*, No. 202, pp. 325-336.
- Cebula, Richard J., John Killingsworth and Willie Belton (1994) : Federal Government Budget Deficits and the Crowding Out of Private Investment in the United States, *Public Finance/Finances Publiques*, Vol. 49, pp. 168-178.
- Cebula, Richard J. and Ira S. Saltz (1998) : Ex Ante Real Long- Term Interest Rates and U. S. Federal Budget Deficits : Preliminary Error-Correction Evidence, 1971-1991, *Economia Internazionale*, Vol. 51, 163-169.
- Courant, Paul N. and Edward M. Gramlich (1986) : Federal Budget Deficits, Englewood Cliffs, NJ : Prentice-Hall, Inc.
- Darrat, Ali F. (2000) : Do Structural Federal Budget Deficits Impact Commercial Bank Interest Rates ? Comment, *Public Finance Review*, Vol. 28, pp. 187-194.
- Evans, Paul (1985) : Do Large Deficits Produce High Interest Rates, *American Economic Review*, Vol. 75, pp. 68-87.
- Evans, Paul (1987) : Interest Rates and Expected Future Deficits in the United States, *Journal of Political Economy*, Vol. 95, pp. 34-55.
- Hausman, Jerry (1978) : Specification Tests in Econometrics, *Econometrica*, Vol. 46, pp. 125-151.
- Hoelscher, Gregory (1983) : Federal Borrowing and Short Term Interest Rates, *Southern Economic Journal*, Vol. 50, 319- 333.
- Hoelscher, Gregory (1986) : New Evidence on Deficits and Interest Rates, *Journal of Money, Credit and Banking*, Vol. 18, pp. 1-17.
- Keynes, John M. (1936) : The General Theory, New York : Harcourt, Brace and Company.
- Krueger, Alan B. (2002) : Big Federal Deficits, Bigger Risks, *New York Times*, March 6, 2003.
- Makin, John (1983) : Real Interest, Money Surprises Anticipated Inflation and Fiscal Deficits, *Review of Economics and Statistics*, Vol. 65, pp. 374-384.
- Mascaro, Angelo and Allan H. Meltzer (1983) : Long and Short Term Interest Rates in a Risky World, *Journal of Monetary Economics*, Vol. 20, pp. 151-200.

- Ostrisky, Anthony (1990) : Federal Budget Deficits and Interest Rates : Comment, *Southern Economic Journal*, Vol. 56, pp. 802-803.
- Ott, David J. and Attiat F. Ott (1970) : Fiscal Policy and the National Debt, in Smith and Teigen, editors, *Readings in Money, National Income and Stabilization Policy*, Homewood, IL : Richard Irwin Publishing Company, pp. 377-388.
- Tanzi, Vito (1985) : Fiscal Deficits and Interest Rates in the United States, *IMF Staff Papers*, Vol. 32, pp. 551-576.
- Thomas, Lloud B. and Ali Abderrazak (1988a) : Anticipated Future Budget Deficits and the Term Structure of Interest Rates, *Southern Economic Journal*, Vol. 55, pp. 150-161.
- Thomas, Lloyd B. and Ali Abderrazak (1988b) : Long-Term Interest Rates : The Role of Expected Budget Deficits, *Public Finance Quarterly*, Vol. 16, pp. 341-356.
- White, Halbert (1980) : A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity, *Econometrica*, Vol. 48, pp. 817-838.